**Scale of Use of Encrypted Currency and Transactions in Medical Tourism**

Haşim ÇAPAR[[1]](#footnote-1)

**Abstract**

**Background:** This study investigates the development of two scales, one is the Intention of Being in Medical Tourism Scale (IBMTScale) and the other is the Scale of Use of Encrypted Currency and Transactions in Medical Tourism (ECTMTScale).

**Methods:** Scales reliability were tested using item analysis for internal consistency (coefficient alpha) and test-retest reliability estimates.

**Results:** Factor analysis for the Scale of Use of Encrypted Currency and Transactions in Medical Tourism (ECTMTScale) was performed on the principal components and a three-factor solution was presented (first factor eigenvalue = 8,132, 47.8% of the variance explained, second factor eigenvalue = 2,004, 11,8% of the variance explained, eigenvalue = 1,138, 6.7% of the variance explained).

**Conclusion:** The validity and reliability study of the Intention of Being in Medical Tourism Scale (IBMTScale) and the Scale of Use of Encrypted Currency and Transactions in Medical Tourism (ECTMTScale) were scientifically conducted and it was found that both scales gave very harmonious results.

**Keywords:** Encreypted Currency and Transactions, Medical Tourism, Intention of Being in Medical tourism.**Introduction**

Today, the encrypted currencies defined as modern currencies have become the global phenomenon that most people know and use. On the other hand, the use of these crypto currencies, where most investors, the bank, the state and the company, do not realise the importance is increasing every day. In the future, many major companies, accounting firms, the state, medical tourism services providing the health institution or the software company will work on this area is clearly visible today. Today, perhaps in a very small part of the community, the crypto currencies are rapidly spreading in the future, which is of great importance to the majority of society. Many scientists, bankers, experts, investors, accountants, economists, and tourism professionals in this important investment and exchange tool are thought to know nothing other than the press and hearsay information.

This study investigates the development of two scales, one is the Intention of Being in Medical Tourism Scale (IBMTScale) and the other is the Scale of Use of Encrypted Currency and Transactions in Medical Tourism (ECTMTScale).

**Bitcoin and Inventor as A Crypto Currency**

In fact, the first inventor of the crypto currency known to many few people is a person named Satoshi Nakamoto, who is clearly unknown to whom and where he is from (1). Satoshi Nakamoto announced the development of "Bitcoin protocols" through its web page "Cryptography Mailing List" Towards the end of 2008 and developed the "Inter-peer Electronic Cash system" (2). Although many people wanted to develop digital money in the 90s, they were not successful. Thanks to a non-centralized digital cash system, Satoshi Nakamoto successfully developed a digital currency "Bitcoin". Basically, "Bitcoin" is a digital coin created with computer codes. Bitcoin can be said to be based solely on peers or inter-peer Internet protocols, regardless of all government inspections. Bitcoin can also be called an encrypted set of data or a currency consisting of complex codes (1).

**The Purpose and Fields of Use of the Encrypted Currency and Transactions in the Medical Tourism**

In these days when we left behind the first quarter of the 21st century, the medical tourism sector has grown more and more important as a sector of added value, and policies on and over by health care servers and governments has become a developed sector. The developments for a sustainable healthcare economy are monitored carefully by the health service servers. Health Service servers must follow technological developments in order to compete within the scope of medical tourism and facilitate compliance with them. As an industry that has been able to take place in the economic policies and action plans of the countries in the first place on medical tourism such as Turkey, Thailand, Singapore, India and the United States, medical tourism has a significant degree of annual.

It can be said that medical tourism is an important sector with a market volume of 100 billion dollars. It is said that 11 million medical tourists annually receive health services in other places outside their own countries, which is approximately 3-4% of the world's population. A number of criteria determined in accordance with the preferences of the potential tourists of the medical tourism market, which is 25% growth annually, points to the countries and the rankings obtained from these points are given. In this context, both potential medical tourists and other stakeholders are required to evaluate the key competition criteria (4).

All the stakeholders of the medical tourism sector, where millions of people come together for different purposes, the money paid in exchange for the required health service, and the process in which these currencies codes are used for the safety of the data should be adapted to the medical tourism sector as soon as they are told (3).

To ensure the security of data that is owned in today's technology world where data mining and data are important, and to create an account-issued decision mechanism, the encrypted currencies and the digital the use of codes in healthcare is considered to be the most important mission of the managers and health service providers who manage competition in medical tourism around the world.

At the beginning of the criteria that medical potential tourists care about in the selection of medical tourism destinations, the costs incurred for safety and health services come (4). In this context, one way of combating strong competitors in medical tourism is differentiation from competitors with the costs of security and health services, which are the two important criteria that potential medical tourists care about. It is thought that these two criteria, which are considered important, can be provided with encrypted currencies and the digital transaction codes used by these currencies.

**Advantages of Encrypted Currency and Transactions in Medical Tourism**

Although health care requires a labor-intensive sector, the production and presentation of healthcare services is greatly influenced by technology. In this context, it is seen that healthcare providers want to highlight the medical technology they use in their fight with their competitors to serve more patients as an important competitive advantage. Health care users who need to receive health care services are widely used in medical technology, which is preferred for health care destinations (4).

The information asymmetry that is considered to exist between the doctor and the patient changes with each passing day in favor of the patient. The reason that this gap of information is changed in favor of the patient can be explained by the effective use of Internet technology, which is now external sources of information. Healthcare users living in the age of technology want to use the payment models that will feel more confident when choosing medical tourism mobility.

Health service providers know that it is a duty to meet the demands and desires of medical tourists, because they know that they have to shape themselves according to the demands of prospective healthcare buyers (9).

**Advantages of Encrypted Currency and Transactions for Medical Tourists and Relatives**

* The ability to pay for the cost of health care with a transparent payment model,
* Minimize the risk of possible thefts during the movement to receive international health care (5, 8, 9).
* Paying the price of the service easily obtained even in countries using different currencies.
* The absence of bureaucratic obstacles experienced during money changes (5, 6).
* Payment of airline, hotel and medical care fee with a single currency until after the movement of medical tourism.
* The ability to make payments with a security-secured currency with digital passwords and the remaining funds are protected against potential risks (6, 8, 9).
* Providing a superior access to health services (15).
* Abolition of restrictions placed by banks (15).
* Patient data related to the delivery of patients rapidly after medical care.
* Procurement of high quality and low cost medical services at international destinations with a borderless and unrestricted currency (5, 7, 9).

Based on the benefits provided, it can be said that the potential tourists who are in the medical tourism movement to get health care service can bypass the unnecessary bureaucratic obstacles with the use of encrypted currency and transactions in medical tourism, obtain a safer payment opportunity and minimize the risks with reliable data transfer.

**Scale Development**

To find out if there are any measurement tools related to the use of the new and current issue of crypmented currencies and transactions within the scope of medical tourism, the literature was scanned with the keywords set out within the scope of this study. However, as a result of the literature study, it was seen that there was no measurement tool directly related to this issue. Given these restrictions, it was decided that it would be appropriate to create the measurement tool items from scratch. Based on the theoretical model, an item pool was created. The article pool, which was created for interpretation and review, was distributed by the researcher to colleagues working in the field of medical tourism and health economics. After this initial review, general readability was given to potential medical tourists with different gender, ethnicity, beliefs and cultures to test the items expression and relevance. The assessment of this measuring instrument by potential medical tourists with different gender, ethnicity, beliefs and cultures was important for the measurement tool to provide the same or similar results anywhere, in all circumstances. These potential medical tourists, ranging from the ages of 36 to 70, came from a variety of different countries, from different social, ethnic, economic and educational backgrounds, and represented various interests among potential medical tourists. The surveying tool was conducted in small groups for 2 months. Further inspection was conducted during the pilot operation described below.

**Pilot Test**

In total, 94 potential medical tourists (between the ages of 33-75) completed the first major version of the measuring instrument as part of the pilot test and commented on the readability and article descriptions of the measuring tool items. The measuring instrument was later identified as 6 items for the Intention of Being in Medical Tourism Scale (IBMTScale) and 17 items for the Scale of Use of Encrypted Currency and Transactions in Medical Tourism (ECTMTScale) based on theoretical compliance and scope according to the comments and feedback made by the participants.

**Materials and Methods**

This study is a methodological study of the validity and reliability of the the Intention of Being in Medical Tourism Scale (IBMTScale) and the Scale of Use of Encrypted Currency and Transactions in Medical Tourism (ECTMTScale).

In this study, the online questionnaire form was used as data collection management. The general universe of this study constitutes potential medical tourists. The universe can be reached in the general universe, 2016-March 2017 on the web sites of medical tourism related associations in the search for information about medical tourism destinations, and the English-speaking 1700 people.

During the research, the whole universe was tried to be reached, but 854 people accepted to participate in the research. During the collection process of the surveys, 575 questionnaires were answered by the participants. Only 555 of these surveys were completed correctly and completely. The turnover rate of the questionnaires was found to be 67.5 %. There are 6 items in the Intention of Being in Medical Tourism Scale (IBMTScale) and 17 items in the Encrypted Currency and Transactions in Medical Tourism (ECTMTScale). It is recommended to reach 5 to 10 times the number of sample items in the scale studies when the sample size is determined (14,15). The number of participants to be sampled in this study was determined as n = 555.

The data collection form used in the research consists of three parts. In the first part, the socio-demographic characteristics of potential medical tourists and the advantages of encrypted currency and transactions for medical tourists were questioned by researchers (7 questions). In the second part, the Intention of Being in Medical Tourism Scale (IBMTScale) (6 items) and in the third part, the Scale of Use of Encrypted Currency and Transactions in Medical Tourism (ECTMTScale) (17 items).

The Intention of Being in Medical Tourism Scale (IBMTScale); is a measure of 6 itemsin only one factor that measure the intention of potential medical tourists to be in medical tourism. Scale items; 5 Likert-type scaling method is defined as "1 = strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree, 5 = strongly agree". The lowest score is 6 points and the highest score is 30 points. The high score on the scale indicates that the intention to stay in medical tourism is high. The Scale of Use of Encrypted Currency and Transactions in Medical Tourism (ECTMTScale); is a measure of 17 items in three factors that measure the advantages of using encrypted currency and transactions in medical tourism in terms of potential medical tourists. Scale items; 5 Likert-type scaling method is defined as "1 = strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree, 5 = strongly agree". The lowest score is 17 points and the highest score is 85 points. The high score on the scale shows that the use of encrypted currency and transactions in medical tourism has a high level of advantage for medical tourists.

**Sample Properties**

The ages of participants ranged from 21 to 88 (mean = 41.62; standard deviation = 13.076). According to the gender of the participants, women are not equal men (women N = 239; men N = 316) but are seen to have a ratio close to each other. The sample selected for this study reflects the ethnic-cultural diversity of society, most commonly defined ethnic-cultural groups: European (N = 192, 34.6 % of the sample), Asian (N = 191, 34.4 % of the sample), Middle East (N = 74, 13.3 % of the sample), American (11.5 % of the sample), African (N = 26, 4.7 % of the sample) and Australian (N = 8, 1.4% of the sample). Another important feature of the participants is their income status. Accordingly, the monthly income of 49.6 % of respondents was between 1600-4500 dollars, the monthly income of 38.4 % of respondents was between 4501-7500 dollars, and the monthly income of 12.1 % respondents was over 7500 dollars (N = 555). According to the sectors in which the participants work, the education sector with a maximum of 23.3 %, respectively, of 15.3 %, with the justice and security sector, of 10.5 %, the social and personal services sector, of 9.8 % with the textile industry and of 41,1 %, various sectors were seen in the foreground. According to the education status of the participants, 12.3 % had a master-doctoral degree, 38.9 % had a bachelor's degree, and 48.2 % of them were graduated from high school.

**Advantages of Encrypted Currency and Transactions for Potential Medical Tourists**

Potential medical tourists' level of participation in this question was questioned with a multi-choice question consisting of the possible advantages of the use of encrypted currency and transactions in medical tourism for potential medical purposes. According to this, 58.4 % of participants said that the most important advantage of encrypted currency and transactions for potential medical tourists is that monetary risk is reduced to a minimum, 53.2 % of participants said that provides access to health services, 49.8 % of participants said that provides a secure payment system, 49.1 % of participants said that they had a positive influence on the intention to deal with medical tourism, 48 % of participants said they could provide evidence in possible malpractice and cases, and 30.5 % of participants said that they prevented the financial losses arising from exchange rate differences.

**Data Analysis**

Both scales discussed in this study were evaluated using SPSS 25 version and SPSS RELIABILITY command for internal consistency reliability (16). Factors for scales were determined using simple component approach analysis based on eigenvalues reported above 1 using principal component analysis with SPSS FACTOR. This approach is based on priority hypotheses to guide the selection of the model. These are supported by slope testing and factor interpretability based on factor scale correlations. The results were considered to be good if the factor loads above 0.71 (50% overlap variance) were excellent, 0.63 (40% overlap variance) were very good and 0.55 (30% overlap variance) were good. Factor loads lower than 0.55 were also considered appropriate if the scale was correlated with the only one factor (17).

**Results**

Internal consistency and factor analysis results of the Intention of Being in Medical Tourism Scale (IBMTScale) and the Scale of Use of Encrypted Currency and Transactions in Medical Tourism (ECTMTScale) are presented in Table 1 and Table 2. For each item in both measures, a 5-point likert type scale was used to answer each question with varying response options ranging from "strongly disagree" to "strongly agree".

Material analysis for the Intention of Being in Medical Tourism Scale (IBMTScale) was conducted on 6 items and found a very reliable and tight fit with an alpha (α) coefficient of 0.88. The item-scale correlations between the items ranged from r = 0.57 to 0.79. Prencipal component analysis for factor analysis was performed and a one-factor solution was provided as expected (eigenvalue = 3,809, 63,5% of the variance explained). The factor loadings ranged from 0.68 to 0.87 among 6 items.

Material analysis for the Scale of Use of Encrypted Currency and Transactions in Medical Tourism (ECTMTScale) was conducted on 17 items and found a very reliable and tight fit with an alpha (α) coefficient of 0.93. The item-scale correlations between the items ranged from r = 0.54 to 0.75. Prencipal component analysis for factor analysis was performed and a three-factor solution was revealed (first factor eigenvalue = 8.132, 47.8 % of the explained variance; second factor eigenvalue = 2.004, 11.8 % of the explained variance; 1.138 third factor eigenvalue = 1.138, 6.7 % of the explained variance). The total variance of the scale was 66.3 %. The factor loadings ranged from 0.51 to 0.82 among 17 items.

**Table 1: Reliability and Factor Analysis of the Intention of Being in Medical Tourism Scale (IBMTScale)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Item** | **FaktorLoading** | | **Mean Item-Total Correlation** |
| Q1:…provides ease of access to healthcare | 0.79 | | 0.68 |
| Q2:…positively affects the intention of being in medical tourism | | 0.87 | 0.79 |
| Q3:…provides a secure payment system | | 0.84 | 0.75 |
| Q4:…provides minimizing monetary risk | | 0.77 | 0.66 |
| Q5:…prevent monetary losses arising from exchange rate differences | | 0.81 | 0.72 |
| Q6:…provides evidence for possible malpractice and financial litigation | | 0.68 | 0.57 |
| **Variance accounted for = 63.5 %** | |  |  |
| Coefficient alpha = .88 | |  |  |

…= Use of Encrypted Currency and Transactions in Medical Tourism

**Table 2: Reliability and Factor Analysis of Scale of Use of Encrypted Currency and Transactions in Medical Tourism (ECTMTScale)**

|  |  |  |
| --- | --- | --- |
| **Item** | **FaktorLoading** | **Mean Item Total Correlation** |
| **Faktor 1 (Access-Security)** |  |  |
| Q1:…provides that the desired health service can be obtained without being connected to a country's money | 0.77 | 0.56 |
| Q2:…provides a great opportunity to patients and relatives | 0.82 | 0.66 |
| Q3:…access to health care services in a shorter time | 0.70 | 0.67 |
| Q4:…eliminates monetary barriers that prevent access to health services | 0.74 | 0.65 |
| Q5:…provides solutions to problems related to exchange rate changes that prevent access to health services | 0.72 | 0.65 |
| Q6:…provides the possibility of a safer payment system with the cost of health care received | 0.66 | 0.65 |
| Q7:…gives more confidence to malicious people and institutions | 0.74 | 0.62 |
| Q8:…provides greater confidence in data and password theft | 0.64 | 0.70 |
| **Faktor 2 (Monetary Risk Minimization)** |  |  |
| Q9:…provides minimize monetary risks arising from exchange rate changes | 0.51 | 0.72 |
| Q10:…minimisation of different bank cuts | 0.75 | 0.68 |
| Q11:…prevents loss of monetary value | 0.80 | 0.75 |
| Q12:…prevents potential money theft | 0.80 | 0.65 |
| Q13:…prevents financial losses arising from differences in currency | 0.59 | 0.70 |
| **Faktör 3 (Malpractice-Civil Trial)** |  |  |
| Q14:…provides evidence to potential financial litigation | 0.69 | 0.70 |
| Q15:…provides evidence to potential malpractice litigation | 0.58 | 0.54 |
| Q16:…provides that the quality of health services received is seen as transparent | 0.46 | 0.64 |
| Q17:…prevent more payments than the cost of health services received | 0.80 | 0.75 |
| **Variance accounted for = 66.3 %** |  |  |
| Coefficient alpha = 0.93 |  |  |

…= Use of Encrypted Currency and Transactions in Medical Tourism

**Test-Retest Reliability**

**Table 3: Test-Retest Reliability Correlations of Intention of Being in Medical Tourism Scale (IBMTScale) and Use of Encrypted Currency and Transactions in Medical Tourism Scale (ECTMTScale).**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **IBMTScale** Score Time 1 | **IBMTScale** Score Time 2 | **ECTMTScale** Score Time 1 | **ECTMTScale** Score Time 2 |
| **IBMTScale** Score Time 1 | **-** | **0.64**\*\* |  |  |
| **IBMTScale** Score Time 1 |  |  | **-** | **0.92**\*\* |

\*\*Correlation is significant at the 0.01 level (2-tailed).

Test-retest reliability of the IBMTScale and the ECTMTScale (Time-Invariant): The test of test-retest measurement was made with 223 participant after 4 weeks. The total point average of the IBMTScale was 21.05 ± 6 in the first test application and 20.8 ± 5 in the re-test application. In the IBMTScale test-re-test reliability review, pearson correlation analysis was made to assess the harmony between the two tests ' total scale score averages and the value was found to be r = 0.64. Similarly, in the ECTMTScale test-re-test reliability review, pearson correlation analysis was made to assess the harmony between the two tests ' total scale score averages and the value was found to be r = 0.92. In addition, the difference between test re-test point averages for both scales was compared with Dependent Group T Test for significance analysis and no statistically significant difference was found (p> 0.05).

**Discussion**

The Intention of Being in Medical Tourism Scale (IBMTScale) is a measure of the intention of medical tourists to select medical tourism destination, which is composed of a series of items that affect the choice of medical tourism destinations. The Use of Encrypted Currency and Transactions in Medical Tourism Scale (ECTMTScale) is a measurement tool that includes a number of items related to the use of encrypted currencies and transactions in medical tourism, and includes some features that are considered to be an advantage for potential medical tourists. It is thought that these scales can be useful in measuring related issues, since the internal consistency level of both scales is high and the test-retest reliability results are high.

Considering that the medical tourism and encrypted currencies are yet to be new, these two fields are related to each other, but they must be seated on a scientific basis to test it as one of the reasons for this study can be evaluated. There is a need for a variety of measurement tools to ensure that healthcare providers serving medical tourism provide the statistical information they need to accurately analyze and make policy requests. The Intention of Being in Medical Tourism Scale (IBMTScale) and The Use of Encrypted Currency and Transactions in Medical Tourism Scale (ECTMTScale) are designed to be simple and easy. These two scales can be used with both single and with other scales to support both health care providers and medical tourism authorities.

As a result of the literature study, there was no scientific study on the use of encrypted currency and transactions in medical tourism. Therefore, since there is no study that can compare the current study, the topic of discussion has been terminated here.

**Limitations and Opportunities for Further Research**

Firstly, as in every study, it is important to interpret this study with the awareness that it is carried out under its own limitations. In addition, the results should be assessed under the fact that encrypted currencies and transactions are shaped according to economic preferences and tendencies and under the fact that fluctuations in the economy. It is necessary to evaluate the results of the group in which the data of this study is collected and the tendencies, preference and requests of other groups may not be the same. With the assumption that this study alone will not be enough, researchers in the future should be supported by working with different groups at different times. In the future, the study carried out in this field with different segments and groups with different socio-economic status is considered to be able to fill the field where this study is restricted.

**Conclusions**

With the preferability of medical tourism destinations, the measurement tools that are valid and reliable are needed in order to measure the relationship between the encrypted currency and transactions with each other. This study has been discussed in the usage and impact scale of the encrypted currencies and transactions in medical tourism, which have the potential to be preferred when medical tourists are choosing a medical tourism destination. Consequently, the study of the use of encrypted currencies and transactions in medical tourism has been evaluated based on some characteristics of medical tourism and encrypted currencies and transactions, and is a valid and safe measurement tool has been developed.

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**A Statement of Competing Interests and Funding Support**

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**A Statement of Any Submissions of Very Similar Work, With References to the Previous Submission If Applicable**

No any statement of any submissions of very similar work.

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1. Istanbul Sabahattin Zaim University, Faculty of Health Sciencies, Deparment of Health Management, Halkalı cad. No:2 Halkalı 34303 Kucukcekmece, Istanbul, Turkey, +902126928894, hasim.capar@izu.edu.tr [↑](#footnote-ref-1)